Eco-innovation in the knowledge economy - challenges and opportunities for ICT

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The theme

New insights from the rise of the ”eco-innovation” agenda:
Clean, Clever and Competitive (Lissabon Strategy)

RQ: What is the link between clean and clever – and ICT?

1. Relate eco-innovation to competitive conditions of the knowledge economy
2. Highlight ICT aspects – part of the solution?
3. Along the way: Upcoming research questions and policy challenges

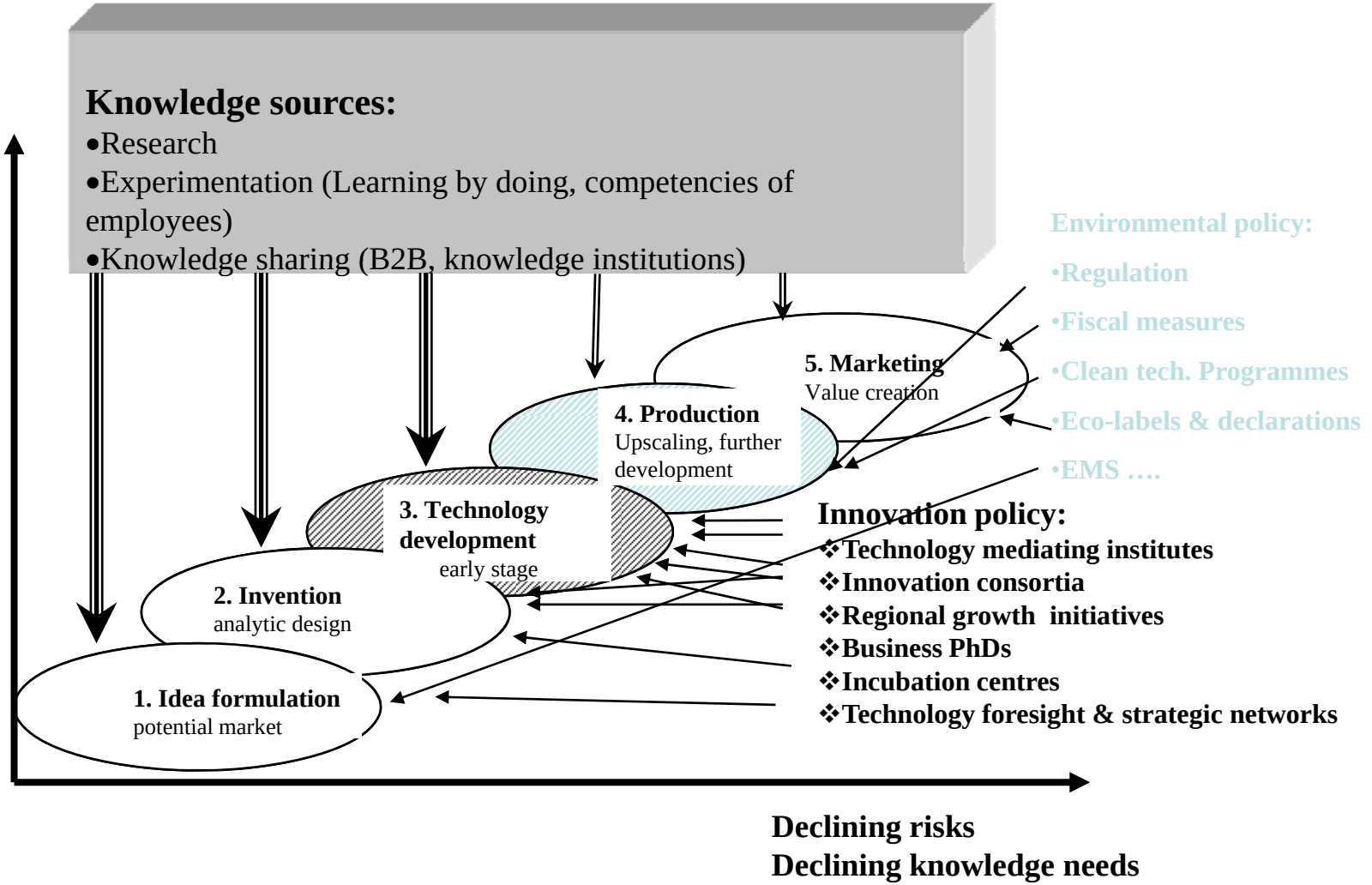
Globalisation & eco-innovation

- New linkage between environmental and innovation policy

  A global race for green competitiveness?

- Eco-innovation policy & visions on the rise
  - Asia: ”Green growth” strategy of UNESCAP
  - China: the ”circular economy”
  - Japan: Ressource efficiency goals
  - US: Sustainable energy production and consumption
  - Europe: ”Clean, clever and competitive” (Lissabon proces)

The innovation process & policy



Source: Own source

Defining eco-innovation

Definition:

- ***"Innovations which are able to attract green rents on the market* – they create value to users while progressively reducing net environmental impacts"**
  - competitiveness parameter rather than environmental assessment
  - greening as a moving target

Strength: The environment as a business case, from burden to opportunity

Weakness: Focus on P rather than C - how do we reach SCP?

Understanding eco-innovation

- *The firm as (eco-) innovator, rather than as a polluter*
  - impacts on the eco-innovation process rather than the environment directly
  - *RQ: the roles different types of companies play for eco-innovation*

- The firm within the wider innovation system
  - the innovative capacity of national/regional innovation systems towards eco-innovation

- *Focus: the degree to which environmental issues are becoming integrated into the economic process*

Green competitiveness – new opportunities

- We know empirically little on the greening of companies/economic sectors
  - Some shift from reactive to proactive environmental strategies – **broad range of incentives**.
  - Short term: risk management.
  - Medium term: some moderate positive connection between environmental performance and competitiveness.
- Development of eco-innovation indicators (FP6 project: "Measuring eco-innovation", upcoming "Observatory on Eco-innovation")

Green competitiveness – new opportunities

Foresights: rapid expansion of global markets - from around currently 390-470 billion to 5-600 bn US$ in 2010.....

Two market segments for eco-industries

- **Developing countries** - 1 pct of GDP- but growth potential - 8-12 pct growth to 2010
- **Developed countries** - 2 pct of GDP- mature markets
  - still a luxury good characteristics of eco-innovation?

  (Source: OECD Kennett & Stenblick 2005)

- Globalisation: new division of eco-innovative labour

Changing competitiveness in the knowledge economy

- Stronger competition resulting from globalisation and deregulation
- Structural change from scale-based manufacturing to new innovation-oriented strategies
- **Knowledge is the key resource** – supported by ICT: growing codification of knowledge and its transmission through ICT

- Innovation has become more rapid, more widely diffused in the economy and closer linked to scientific progress

New eco-innovation opportunities in the knowledge economy?

1. Markets are more transparent: companies have to account for what they are doing (globally)

2. Markets are more communicative: more info on products

3. Product stories are increasingly important: branding

4. Competition for human capital – new demands on companies from the workforce

Towards a green techno-economic paradigm?

- A full-world economy: A high environmental performance as an international business standard and foundation for competitiveness

- From a a ”wasteful” to a ”ressource-efficient” technological trajectory

A green learning curve

- High knowledge needs for linking up individual action (in production and consumption) to environmental impact

- Uneven greening among sectors & regional innovation systems?
  - high transaction costs and friction to eco-innovation (lock-in to none-green practices and strategies)

- Green industrial dynamics: Distribution of green strategies, competencies and search rules

ICT - 3 main opportunities for eco-innovation

1. **Well-functioning green markets have very high information and knowledge demands**
   – ICT is essentail for creating clever markets that may meet these demands – we need novel solutions

2. **Organisational development** – EMS and ICT tools for clever production and proactive strategizing

3. **Clever buildings and cities for sustainable consumption – ICT has a key role in creating systems/technologies which systematically and continously may**
   a) regulate our consumption
   b) inform us about our consumption
   c) make eco-consumption fun, fancy and comfortable

We need systems which provide direct and immediate feedback on our consumption/activities and its environmental impacts so as to allow us to use resources efficiently, i.e. at the right time, the right space and the right amount.

ICT – challenges for eco-innovation

- Setting the ICT sector on a green path

- Strengthen environmental competencies and green search rules

- Enabling effects – look for novel application opportunities for smart systems – also in none-high tech sectors

- ICT and the division of eco-innovative labour - How to achieve efficient learning and coordination on eco-innovations across different economic sectors and other actors in the innovation system

- Globalisation- Identify and address the particular conditions for eco-innovation in different types of (national) innovation systems

A taxonomy of eco-innovations

Five categories of eco-innovations:

1. **Add-on eco-innovations** – remedying the environmental problems of the customer ex-post

2. **Integrated eco-innovations** – cleaner similar solutions

3. **Alternative product eco-innovations** – cleaner dissimilar solutions

4. **Macro-organizational eco-innovations** - new solutions for an eco-efficient way of organizing our production and consumption at the more systemic level

5. **General purpose eco-innovations -** (**ICT**, biotechnology and nanotechnology) - enabling (derived rather than direct) and pervasive effects on (eco-)innovations

RQ: how ICT has changed in contribution and role in the eco-innovation process over time and space

Conclusions – ICT steps towards eco-innovation

- ICT may form a very important part of the eco-innovation agenda of tomorrow if the opportunities are seized

including:

  - ICT innovations contribute to direct environmental improvements but more importantly in aiding the development of clever, self-sustaining resource efficient technology systems.

  - The long run focus: Contributing to wiring up national innovation systems for eco-innovation by making more well-functioning green markets and organisations

- We need to know more about the industrial dynamics of the greening of the ICT industry – what role do different types of companies and sectors play for the greening of markets?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Thank you